

AMENDMENTS TO THE CLAIMS

LISTING OF CLAIMS:

Claim 1 (Currently amended) ~~A process~~ Process for obtaining a bulk gallium-containing nitride ~~monocrystals~~ monocrystal from supercritical ammonia-containing solution in the presence of a mineralizer, ~~characterized in that~~ wherein in a pressurized reaction vessel – using ammonia as solvent and Group I element azides and optionally Group II element azides as mineralizer, a supercritical ammonia-containing solution including Group I and optionally Group II element ions is first obtained to dissolve next a gallium-containing feedstock at dissolution temperature and/or dissolution pressure and then ~~the desired~~ gallium-containing nitride is crystallized from the supercritical solution on the surface of at least one seed at the crystallization temperature and/or crystallization pressure, wherein the crystallization temperature and/or crystallization pressure is selected according to the temperature coefficient of solubility and pressure coefficient of solubility of the ~~desired~~ gallium-containing nitride to be crystallized.

Claim 2 (Currently amended) ~~A process~~ Process for obtaining a bulk gallium-containing nitride ~~monocrystals~~ monocrystal from supercritical ammonia-containing solution in the presence of Group I and optionally Group II element-containing mineralizer, ~~characterized in that~~ wherein when gallium-containing nitride has a negative temperature coefficient of solubility and a positive pressure coefficient of solubility in supercritical ammonia-containing solution, in the presence of Group I and optionally Group II element-containing mineralizer, in a pressurized reaction vessel – using Group I element azides and optionally Group II element azides as mineralizers – supercritical ammonia-containing solution including Group I and optionally Group II element ions is first obtained to dissolve next a gallium-containing feedstock at dissolution temperature and/or dissolution pressure and then gallium-containing nitride is crystallized from the supercritical solution on the surface of at least one seed by means of bringing the temperature to crystallization temperature and/or the pressure to crystallization pressure, the crystallization temperature being higher than the dissolution temperature and/or the crystallization pressure being lower than the dissolution pressure at least at the crystallization zone of the pressurized reaction vessel, where the seed is placed – so that super-saturation of the supercritical solution with respect to the seed is achieved – and then the super-saturation of the supercritical solution is maintained at the level at

which spontaneous crystallization of the nitride may be neglected, while crystallization of the ~~desired~~ gallium-containing nitride is carried out on the seed.

Claim 3 (Currently Amended) Process according to claim 1, ~~characterized in that~~ wherein the gaseous nitrogen, produced during the decomposition of the azide, is at least partially evacuated from the system before the re-crystallization step is started.

Claim 4 (Currently Amended) Process according to claim 1, ~~characterized in that~~ wherein as a gallium-containing nitride – the nitride having a general formula $Al_xGa_{1-x}N$, where $0 \leq x < 1$ is crystallized.

Claim 5 (Currently Amended) Process according to claim 1, ~~characterized in that~~ wherein the azide mineralizers are selected from the group consisting of LiN_3 , NaN_3 , KN_3 , CsN_3 and mixtures thereof.

Claim 6 (Currently Amended) Process according to claim 5, ~~characterized in that~~ wherein the mineralizer used contains at least one compound selected from the group consisting of LiN_3 , NaN_3 , KN_3 and CsN_3 .

Claim 7 (Currently amended) Process according to the claim 6, ~~characterized in that~~ wherein the mineralizer contains NaN_3 and KN_3 mixed in arbitrary molar ratio.

Claim 8 (Currently amended) Process according to the claim 6, ~~characterized in that~~ wherein the mineralizer contains NaN_3 and LiN_3 mixed in arbitrary molar ratio.

Claim 9 (Currently amended) Process according to the claim 6, ~~characterized in that~~ wherein the mineralizer contains KN_3 and LiN_3 mixed in arbitrary molar ratio.

Claim 10 (Currently amended) Process according to the claim 6, ~~characterized in that~~ wherein the mineralizer contains also Group I and optionally Group II element-containing compound(s) other than azides.

Claim 11 (Currently Amended) Process according to claim 1, ~~characterized in that~~ wherein Group I element azides are introduced into the system in a molar ratio of azides to ammonia ranging from 1:200 to 1:2.

Claim 12 (Currently Amended) Process according to claim 1, ~~characterized in that~~ wherein a seed crystal with at least a crystalline layer of Group XIII element nitride, preferably gallium-containing nitride, having a dislocation density less than $10^7 / \text{cm}^2$ is used.

Claim 13 (Currently Amended) Process according to claim 1, ~~characterized in that~~ wherein a structure having a number of surfaces spaced adequately far from each other, arranged on a primary substrate and susceptible to the lateral overgrowth of crystalline nitrides is used as a seed.

Claim 14 (Currently Amended) Process according to claim 1, ~~characterized in that~~ wherein a monocrystalline nitride layer is obtained having the same or better quality as it gets thicker.

Claim 15 (Currently Amended) Process according to claim 13, ~~characterized in that~~ wherein the seed contains the primary substrate made of a crystalline nitride of Group XIII elements.

Claim 16 (Currently amended) Process according to claim 15, ~~characterized in that~~ wherein the seed contains the primary substrate made of gallium nitride – GaN.

Claim 17 (Currently amended) Process according to claim 15, ~~characterized in that~~ wherein the seed contains the primary substrate made of a crystalline material such as sapphire, spinel, ZnO, SiC or Si, wherein the primary substrate made of the material reacting with a supercritical ammonia-containing solution is covered with a protective layer, preferably made of a nitride containing Group XIII elements or metallic Ag, prior to formation of a monocrystalline nitride layer.

Claim 18 (Currently Amended) Process according to claim 1, ~~characterized in that~~ wherein the bulk nitride ~~monocrystals~~ monocrystal obtained ~~consist~~ consists essentially of gallium nitride – GaN.

Claim 19 (Currently Amended) Process according to claim 1, ~~characterized in that~~ wherein the bulk nitride ~~monocrystals~~ monocrystal obtained ~~contain~~ contains any of the following elements: Ni, Cr, Co, Ti, Fe, Al, Ag, Mo, W, Si and Mn.

Claim 20 (Currently Amended) Process according to claim 1, ~~characterized in that~~ wherein some surfaces of the seed are covered with a mask layer prior to formation of a monocrystalline nitride layer.

Claim 21 (Original) A bulk nitride monocrystal obtained by a process according to claim 1, wherein the bulk nitride monocrystal has surface dislocation density of lower than $10^6/\text{cm}^2$.

Claim 22-24 (Canceled)

Claim 25 (Currently amended) ~~Mineralizer~~ A mineralizer used for supercritical ammonia-containing solution, comprising which comprises at least one compound selected from the group consisting of LiN_3 , NaN_3 , KN_3 , and CsN_3 , wherein the mineralizer has a property of producing a bulk nitride monocrystal having surface dislocation density of lower than $10^6/\text{cm}^2$.

Claim 26 (Currently amended) ~~Mineralizer~~ The mineralizer according to the claim 25, which contains NaN_3 and KN_3 in arbitrary molar ratio of NaN_3 to KN_3 .

Claim 27 (Currently amended) ~~Mineralizer~~ The mineralizer according to the claim 25, which contains NaN_3 and LiN_3 in arbitrary molar ratio of NaN_3 to LiN_3 .

Claim 28 (Currently amended) ~~Mineralizer~~ The mineralizer according to the claim 25, which contains KN_3 and LiN_3 in arbitrary molar ratio of KN_3 to LiN_3 .

Claim 29 (Currently amended) ~~Mineralizer~~ The mineralizer according to the claim 25, which contains NaN_3 , KN_3 and LiN_3 in arbitrary molar ratio of NaN_3 to KN_3 and LiN_3 .

Claim 30 (Currently amended) ~~Mineralizer~~ The mineralizer according to the claim 25, which further contains Group I and optionally Group II element-containing compound(s) other than azides and/or Group I element, and/or Group II element.

Claim 31 (New) A method for epitaxy comprising obtaining a bulk nitride monocrystal according to claim 21 as substrate for epitaxy and creating epitaxy.

Claim 32 (New) The method of claim 31, wherein the bulk nitride monocrystal has at least one epitaxial layer of the same or different Group XIII element nitride, deposited by a MOCVD, HVPE or MBE method as a template for opto-electronic devices.

Claim 33 (New) The method of claim 32, wherein the epitaxial layer is doped with one or more dopants.